MODELLING THE INFLUENCE OF SUBSIDIZATION ON ELECTRIC DISTRIBUTION COMPANY PERFORMANCE: CASE STUDY

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ABSTRACT
The decrease of subsidies in energy prices is considered as one of the strategic objectives of today's societies and on the performance of electrical companies has the important impact. In this paper, the effects of decrease in difference between marginal prices and electricity tariffs in the electrical energy sector on the performance of distribution companies are investigated and the effectiveness of it in subjects such as reducing energy consumption, peak load, level of customer satisfaction, timely payment of electricity bills, increase in revenue and the increased presence of distributed generation (DG) are studied and finally, according to the mission, values and vision of electric power distribution companies, a general model of company performance is introduced.

In this study, two methods to evaluate the impact of the decrease of subsidies on the performance of distribution companies have been used. In the first method, to gather information through questionnaires and interviews with experts, analysis of data is obtained by software spss. In the other method, based on the registered historical data on the websites of the Ministry of Energy, Tavanir company for electric power distribution companies. In the end, according to various models of subsidies in the world a new model is proposed for the continuation of the subsidy in Iran.

This model is structurally and functionally has been originated from Michael Todaro model, a hybrid model of successful in Asian countries such as Malaysia and the European system of subsidies like UK. It is worth noting that this study as a typical scheme has been validated in the Gilan electric power distribution company located in the southern of the Caspian Sea.

Key words: subsidies, peak load, satisfaction, model, certainty level.

INTRODUCTION
In the vast majority of countries, governments support groups for specific social, economic and political benefits are paid that by appealing to the benefits of growth and development groups to provide their own. A large part of this support, direct and indirect subsidies that can be transferred to the target groups. Subsidies project, one of the main concerns of the Islamic Republic of Iran in order to achieve social justice among low-income community.

Finally, after 33 years of Islamic Revolution in Iran and spent 8 presidency, on 19 December 2010 has been implemented by the ninth government. Implementation of this project in the energy sector (electricity) on the performance of the electricity distribution companies has created problems, which is the author's review.

RESEARCH QUESTIONS
1. Is the implementation of targeted subsidies in the power distribution companies to reduce energy consumption and peak load with the network?
2. Is the implementation of targeted subsidies lead to increased customer satisfaction and timely payment of electricity bills were used?
3. Is the implementation of targeted subsidies in the electricity distribution companies was to increase income?
4. Is the implementation of targeted subsidies, the private sector has increased in the distributed generation power plants?

THE HISTORY OF THE FORMATION OF THE SUBSIDIES IN THE WORLD
Thinking about development, poverty reduction and attention to physical capital was formed in the 1950s. Then in the 1970s, according to human resources, health and education became more prominent. Until the 1980s, the world began to pay public subsidies and followed by the emergence of the debt crisis and economic recession led to subsidies was.

In the beginning of the revolution and the war, pricing goods was and commodities and subsidies rationing plan aimed at curbing inflation and stabilizing prices began, and accelerating in the first development plan (1989-1993) to support the poor.

The trend of economic adjustment policies in the early 1990s led to the raising of issues related to the elimination of subsidies. At the end of the first five-year development plan, the amount of subsidies reached its peak. The Second Development Plan (1995-1999) the share of subsidies from public funds took on a decreasing trend. In the third and fourth development plan (2000-2008) subsidies project, was not implemented due to lack of clear information from people income’s [1].

MICHAEL TODARO THEORY IN RELATION TO ECONOMIC DEVELOPMENT
Michael Todaro of leading experts Development Economics regarding the development of said development means continuous improvement of the entire society and social system towards a better life and more human. Which pursues three main objectives:
(1) basic needs
(2) confidence
(3) The freedom and ability to choose

THE DEFINITION OF SUBSIDIES BY MICHAEL TODARO

Subsidies include government financial assistance to manufacturers and distributors in the industry in order to prevent stagnation of industry and avoid rising prices of goods and encourage the industry to invest and more employment [2].

SUBSIDIES DEFINED BY THE OXFORD DICTIONARY

The total subsidy is money that the government pays to industry or economic activity and in return keeps commodity prices down.

LOOK AT THE SYSTEM OF SUBSIDIES IN SOME COUNTRIES

Cash and non-cash subsidies not only in Iran but also in other countries implementation is and always faced with opposition and agreed. The remarkable thing is that in all developed countries, the subsidies paid to economic activity and are not paid to people [3].

BRITISH SUBSIDIES

Subsidies in the United Kingdom by several government organizations organized and distributed In the England 6 billion pounds annually as subsidies, especially for private companies in the form of low-interest loans, grants and tax breaks, paid. In the UK, subsidies are allocated to industries and economic activities.

MALAYSIA IS ONE OF THE SUCCESSFUL ASIAN COUNTRIES IN THE SUBSIDY

Malaysia as one of the countries with the highest subsidy paid to the public. Since 2008, the economic development plan, subsidizing some goods and services corrected and low-income sectors of society, part of the subsidies to be paid in cash. In the past few years, Malaysia by targeted subsidies could offset its budget deficit. Malaysian government officials, implementation of targeted subsidies in this country know the only way out of debt in the coming years.

In this study, we examined Gilan electric power distribution company and to learn more, its features are briefly explained: Gilan electric power distribution company was registered on (03/15/1992) under the number 89157 and started its activities. Gilan electric power distribution company is responsible for supply and maintenance of all network subscribers in Gilan province, including household connections, public, agricultural, industrial and commercial and now, with the 1350000 customer's, is located in the south Caspian Sea[4].

METHODS AND TOOLS FOR DATA COLLECTION

In this study, two methods to evaluate the impact of the project subsidies on the Gilan electricity power distribution company has been and researcher in the process of doing research is going to be a good model for the continuation of the implementation of targeted subsidies offer.

Method One: Gather information through questionnaires and interviews with experts and analysis of data obtained with the help of spss software and statistical methods t-test for independent univariate tests and the use of indicators to describe the mean and standard deviation questions[5].

Second method: Through theoretical studies and upstream according to the documents, the data on the websites of the Ministry of Energy, Gilan electric power distribution Company been recorded and compared to the figures for the years before and after of subsidies that analyze data in this manner using indicators such as mean, standard deviation and independent t-test bivariate tests are done[6].

At the end of the according to subsidize various models, the new model will be presented for continuing subsidies in Iran. This model is structurally and functionally has been originated from Michael Todaro model. a hybrid model of successful in Asian countries such as Malaysia and the European system of subsidies like UK. The proposed model outputs that can be marked with green color in the form of: satisfaction, reliable electricity supply, increase income, pay bills on time and reducing peak load noted.

SAMPLING AND SAMPLE SIZE

The population of this research, managers and specialists Gilan electric power distribution company, experts Ministry of Energy and Industry with bachelor's degrees and are experts in the field of implementation of targeted subsidies. For sample selection, the list of managers and specialists were prepared, among them the required number of sampling using Morgan, were selected [7].
The number of experts in this field were 280 people and according to Morgan, questionnaires were sent to 162. Among them, 120 people responded to a questionnaire and data were collected and 42 others did not receive a response.

The first question test:
HO: $\mu \geq 2.5$
Implementation of targeted subsidies reduce energy consumption and peak network load. (the government claims)
H1: $\mu < 2.5$
Implementation of targeted subsidies not reduce energy consumption and peak network load. (Researcher claims)

Results: (SIG) is smaller than 0.01, then with 99% certainty level H0 is rejected and H1 accepted.

The second question test:
HO: $\mu \geq 2.5$
Implementation of targeted subsidies is lead to satisfaction and timely payment of electricity bills. (The government claims)
H1: $\mu < 2.5$
Implementation of targeted subsidies isn’t lead to satisfaction and timely payment of electricity bills (Researcher claims).

Results: (SIG) is smaller than 0.01, then with 99% certainty level H0 is rejected and H1 accepted.

The third question test:
HO: $\mu \geq 2.5$
Implementation of targeted subsidies was increased company revenue (The government claims)
H1: $\mu < 2.5$
Implementation of targeted subsidies was increased company revenue (Researcher claims).

Results: (SIG) is smaller than 0.01, then with 99% certainty level H0 is rejected and H1 accepted.

The fourth question test:
HO: $\mu \geq 2.5$
Implementation of targeted subsidies lead to increased participation of the private sector in the creation of production plants scattered. (The government claims)
H1: $\mu < 2.5$
Implementation of targeted subsidies is not lead to increased participation of the private sector in the creation of production plants scattered. (Researcher claims)

Results: (SIG) is smaller than 0.01, then with 99% certainty level H0 is rejected and H1 accepted.

Statistical methods used to analyze data recorded in the second (upstream documents):

<table>
<thead>
<tr>
<th>year</th>
<th>peak load (MW)</th>
<th>energy consumption (million kWh)</th>
<th>per capita energy consumption (kwh)</th>
<th>waste energy (percent)</th>
<th>pay bills on time (percent)</th>
<th>corporate debt to contractors (Billion)</th>
<th>people satisfaction (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>808</td>
<td>3103</td>
<td>13.4</td>
<td>294</td>
<td>27</td>
<td>5</td>
<td>99</td>
</tr>
<tr>
<td>2008</td>
<td>812.5</td>
<td>3443</td>
<td>13.4</td>
<td>294</td>
<td>27</td>
<td>5</td>
<td>99</td>
</tr>
<tr>
<td>2009</td>
<td>894.6</td>
<td>3517</td>
<td>12.6</td>
<td>300</td>
<td>22</td>
<td>20</td>
<td>98</td>
</tr>
<tr>
<td>2010</td>
<td>101.15</td>
<td>3859</td>
<td>12.98</td>
<td>97.1</td>
<td>20</td>
<td>91</td>
<td>98</td>
</tr>
<tr>
<td>2011</td>
<td>1010.5</td>
<td>3590</td>
<td>13.11</td>
<td>98.07</td>
<td>91</td>
<td>92</td>
<td>97</td>
</tr>
<tr>
<td>2012</td>
<td>1025.1</td>
<td>3869</td>
<td>13.71</td>
<td>95.08</td>
<td>92</td>
<td>120</td>
<td>98</td>
</tr>
<tr>
<td>2013</td>
<td>986.3</td>
<td>3443</td>
<td>13.32</td>
<td>95.8</td>
<td>92</td>
<td>170</td>
<td>95</td>
</tr>
</tbody>
</table>

Table1. Information and records 2007 to 2013 years is as follows [8].
The information contained in the column between 2007, 2008, 2009 and 2010 a function of the years prior to the implementation of targeted subsidies and the information contained in the column between 2011, 2012 and 2013 as a function of the years following the implementation of targeted subsidies considered.

**The first question test:**

H0: \( \mu_1 = \mu_2 \)  
Average peak load and energy consumption before and after subsidies are the same.  
H1: \( \mu_1 \neq \mu_2 \)  
Average peak load and energy consumption before and after the subsidies are not the same.

**Results:** (sig) in all four variable peak network load, energy consumption, waste energy, energy consumption per capita is more than 0.05. Thus, H0 can not be ruled out, this means that the average peak load and energy consumption in the years before and after subsidies are not significantly different from each other.

**The second question test:**

H0: \( \mu_1 = \mu_2 \)  
Average satisfaction and timely payment of electricity bills before and after subsidies are the same.  
H1: \( \mu_1 \neq \mu_2 \)  
Average satisfaction and timely payment of electricity bills before and after subsidies are not the same.

**Results:** (sig) in all two variable public satisfaction and timely payment for electricity is more than 0.05. Thus, H0 can not be ruled out, this means that the average public satisfaction and timely payment for electricity in the years before and after subsidies are not significantly different from each other.

**The third question test:**

H0: \( \mu_1 = \mu_2 \)  
Average income before and after subsidies is the same.  
H1: \( \mu_1 \neq \mu_2 \)  
Average income before and after subsidies is not the same.

**Results:** (sig) in variable income is more than 0.05. Thus, H0 can not be ruled out, this means that the average income in the years before and after subsidies are not significantly different from each other.

**The fourth question test:**

In relation to the fourth question refers to the presence of the private sector in energy distributed generation (DG), data recorded in row 8 table indicate that the participation of the private sector before and after the implementation of targeted subsidies were zero.

**CONCLUSION**

The results of the implementation of targeted subsidies in two surveys of experts and data recorded, this fact reveals to us that Implementation of targeted subsidies not been successful achieve its preset goals. Thus researcher proposes a new model to correct previous model.

**THE PROPOSED MODEL**

**Implementation of the proposed model step by step:**

1. proper and transparent infrastructure should be provided to identify low-income people.  
2. After identifying people with low incomes, people with high incomes will be deleted from the list.  
3. The financial discipline in the process of government subsidies are under strict control.  
4. The amount allocated to each household to household credit card will be charged.  
5. The subsidies in credit card just to pay for household energy be considered.  
6. A portion of the collected sum for energy subsidies to households after month, to fund subsidies given country.  
7. Another part of the funds obtained from the sale of energy to be allocated the Ministry of Energy to fund energy production.  
8. Ministry of Energy of the revenue necessary steps to timely payment of debts to contractors and suppliers of technical equipment and expenditure side in order to improve the system and the quality and quantity of their services spend that will increase the level of satisfaction with the public.  
9. Implementation of Clause 5 makes the electricity bills paid on time. As a result, the cost of obtaining funds from the reduced electricity bills.  
10. Motivate people to save and reduce energy consumption there will be, because the additional costs of energy consumption must pay personal income.  
11. By allocating part of the revenue from the sale of energy to the owners of the manufacturing industry, the private sector in creation of distributed power generation (DG) will be greater.  
12. Electricity production in the country will increase and the private sector will be less expensive to produce.  
13. The products will be marketed at a lower cost. And in the end, we will have a productive and dynamic economy.
REFERENCES
